THEORY OF COMPUTATION
FINITE AUTOMATA

1. Finite automata can be used in

(a) Lexical Analysis
(b) Syntax Analysis
(c) Semantic Analysis
(d) None of these

2. Consider the following statements.

(i) Kleen closure of an empty language is non-empty.
(ii) Some infinite languages are regular.
(iii) L = $\{a^P / P$ is a prime number$\}$ is a regular language.

(a) Only (i) is true
(b) Only (ii) & (iii) are true
(c) Only (i) & (ii) are true
(d) All are true

3. For a given NFA with n state, the maximum number of state possible in the equivalent DFA is

(a) 1
(b) n
(c) n + 1
(d) 2^n

4. The minimal finite automata that accepts all strings of a's & b's, where the number of a's is atleast 'n' contains _____ number of states.

(a) n – 1
(b) n
(c) n + 1
(d) n + 2

5. Consider the minimal Finite automata that accepts all the strings of a's & b's where each string contains

(i) exactly 5 a's
(ii) atmost 5 a's

The No. of states in each case respectively are:

(a) 6, 6
(b) 7, 7

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(c) 7, 7 (d) 7, 6

6. Consider the Minimal Finite Automata that accept all the strings of a's & b's where no. of a's is congruent to 2 mod 3. The no. of states in this automata is

(a) 4 (b) 3
(c) 2 (d) 1

7. What is the number of states in a minimal finite automata that accepts all the strings of a's & b's where each string starts with 'a' and total length of the string is divisible by 3.

(a) 3 (b) 4
(c) 5 (d) 6

8. What is the number of states in the minimal finite automata that accepts all the strings of a's and b's where each string starts with 'bba' and the length of the string is congruent to 2(mod 6).

(a) 8 (b) 9
(c) 10 (d) 11

9. Construct the minimal finite automata that accept all the strings of 0's & 1's is where the integer equivalent is congruent to 1(mod 4). What is the no. of states in minimal finite automata?

(a) 4 (b) 3
(c) 2 (d) 1

10. Construct the minimal finite automata that accept all the strings of 0's and 1's where the integer equivalent of the binary string is congruent to 3 mod 6. What is the no. of states in the minimal finite automata?

(a) 6 (b) 5
(c) 4 (d) 3

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11. Given Σ = {0, 1}, the minimal finite automata that accepts all the strings from the given alphabet where the integer equivalent of the binary string is congruent to 5(mod 8) has _____ no. of states.

(a) 8 (b) 7
(c) 5 (d) 4

12. Given language L = $\{a^m b^n c^p \mid m,n,p \geq 0\}$, Σ = {a,b, c}. Find the number of states in minimal finite automata of the above language.

(a) 3 (b) 4
(c) 5 (d) 6

13. Given L = $\{a^m b^n c^p d^q \mid m,n,p,q \geq 0\}$, Σ = {a, b, c, d}, find the number of states in the minimal finite automata of the language.

(a) 3 (b) 4
(c) 5 (d) 6

14. Given a language L = $\{a^m b^n \mid m \geq 0, n \geq 2\}$, Σ={a, b}. Find the number of states in the minimal finite automata that accepts the above language.

(a) 3 (b) 4
(c) 5 (d) 6

15. L = $\{a^m b^n \mid m \geq 0, n \geq 2016\}$, Σ={a, b}. Find the no. of states in the minimal finite automata that accepts this language.

(a) 2016 (b) 2017
(c) 2018 (d) 2019

16. The number of states in MFA that accept all the strings of a's & b's where each string contain odd occurrence of the substring ab is

(a) 4 (b) 5
(c) 6 (d) 7

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17. The number of states in MFA that accepts all the strings of a's & b's where each string contains even occurrences of substring ab

(a) 4 (b) 5
(c) 6 (d) 7

18. What is the number of final states in the minimal finite automata, where $\Sigma = \{a, b\}$, if every string start with "aa" and length of string is not congruent to 0(mod 4)

(a) 4 (b) 3
(c) 2 (d) 1

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